

US Pat. App. Ser. No. 09/997,168
filed in response to Office Action of 7/6/2005

ATTORNEY DOCKET: D1815-00053

REMARKS

This reply is responsive to the office action dated July 6, 2005.

The Office Action of July 6, 2005 has been carefully considered. Upon entry of this amendment, claims 1-4, 7-11 and 26-29 are pending. Claims 5, 6 and 24 have been cancelled; claims 12-23 and 25 have been withdrawn, claims 1, 4, 8 and 26 have been amended, and new claims 27-29 have been added. No new matter has been added. The present application is believed to be in condition for allowance.

In the office action, the examiner:

- rejected claims 8 and 26 under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 4,550,051 to Spielau et al. ("the Spielau patent") in view of EP 0783960 to Westre ("the Westre reference");
- rejected claims 1-4 and 9-11 under 35 U.S.C. § 103(a) as unpatentable over the Spielau patent in view of the Westre reference, and further in view of U.S. Patent No. 5,316,604 to Fell ("the Fell patent");
- rejected claims 1-4 and 7 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,451,528 to Krause ("the Krause patent") in view of the Westre reference, and further in view of the Fell patent.

Rejections Under 35 U.S.C. §103(a)

The Spielau Patent and Westre Reference

Claims 8 and 26 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the Spielau patent in view of the Westre reference.

Claim 8 has been amended to recite:

"... a multi-layered composite including:

- (i) a pair of resin-impregnated, fiber-containing layers ...
- (ii) a fiber-containing core layer ... said fiber-containing core layer sandwiched between said pair of resin-impregnated, fiber-containing layers ...

wherein said fiber-containing core layer comprises poorly wetted or weakly bonded fibers."

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Claim 26 has been amended to recite:

"... a multi-layered composite material ... include[ing]
(i) a pair of resin-impregnated, fiber-containing layers ...
(ii) a fiber-containing core layer ... sandwiched between
said pair of resin-impregnated, fiber-containing layers ...
wherein said fiber-containing core layer comprises poorly
wetted or weakly bonded fibers"

Claims 8 and 26 are patentable over the Spielau patent and the Westre reference, because those references, either alone or in combination, fail to disclose, teach or suggest "... a multi-layered composite [] including ... a pair of resin-impregnated, fiber-containing layers ... [and] a fiber-containing core layer ... sandwiched between said pair of resin-impregnated, fiber-containing layers ... wherein said fiber-containing core layer comprises poorly wetted or weakly bonded fibers," as required by claims 8 and 26.

Rather, the Spielau patent discloses a laminate construction constituting a bonded multilayer composite of resin-impregnated outer plies with resin-impregnated core plies. (See the Spielau patent, col. 2, lines 32-36; col. 6, lines 40-49.) The laminates are generally produced by saturating the fiber layer with impregnating solution. (See *id.*, col. 5, lines 50-51.) Flat textile forms which can be readily impregnated and carry a large amount of resin are preferred. (See *id.*, col. 6, lines 4-7.) Thus, the Spielau patent does not disclose, teach, or suggest providing a core layer of poorly wetted or weakly bonded fibers, but rather discloses that its core layer is *impregnated* with resin.

Likewise, the Westre reference discloses hybrid laminates including layers of titanium alloy foil alternating with layers of a polymeric matrix with reinforcing fibers embedded therein. (See the Westre reference, col. 2, lines 46-50; col. 5, lines 29-34.) The preferred organic polymeric composite is formed of a prepreg in the form of continuous parallel reinforcing fibers coated with a resin. (See *id.*, col. 3, lines 20-23.) Each ply in the hybrid laminate includes an organic polymeric resin within which is embedded parallel reinforcing fibers. (See *id.*, col. 6, lines 45-51.) In the case of

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thermoplastic composites, it is preferred that the laminates are prepared by successively laying down long continuous strips of thermoplastic resin preimpregnated fibrous tapes by means of a thermoplastic application head. (*See id.*, col. 8, lines 1-6.) Thus, like the Spielau patent, the Westre reference discloses that its laminate layers are *impregnated* or *embedded* within the resin matrix, and thus does not disclose, teach or suggest providing a core layer of poorly wetted or weakly bonded fibers.

Since the Spielau patent and the Westre reference, either alone or in combination, fail to disclose, teach or suggest all of the limitations of claims 8 and 26, applicant requests that the 35 U.S.C. § 103(a) rejection of claims 8 and 26 be withdrawn and that claims 8 and 26 be allowed.

The Spielau Patent, the Westre Reference and the Fell Patent

Claims 1-4 and 9-11 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the Spielau patent in view of the Westre reference, and further in view of the Fell patent.

Claim 1 has been amended to recite:

"... a multi-layered composite ... including:

- (i) a pair of resin-impregnated, fiber-containing layers...
 - (ii) a fiber-containing core layer ... sandwiched between said pair of resin-impregnated, fiber-containing layers ...
- wherein said fiber-containing core layer comprises poorly wetted or weakly bonded fibers."

Claim 8 has been amended to recite:

"... a multi-layered composite including:

- (i) a pair of resin-impregnated, fiber-containing layers ...
 - (ii) a fiber-containing core layer ... sandwiched between said pair of resin-impregnated, fiber-containing layers ...
- wherein said fiber-containing core layer comprises poorly wetted or weakly bonded fibers."

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Claims 1 and 8 are patentable over the Spielau patent and the Westre reference, because those references, either alone or in combination, fail to disclose, teach or suggest "... a multi-layered composite [] including ... a pair of resin-impregnated, fiber-containing layers ... [and] a fiber-containing core layer ... sandwiched between said pair of resin-impregnated, fiber-containing layers ... wherein said fiber-containing core layer comprises poorly wetted or weakly bonded fibers," as required by claims 1 and 8.

As noted above, the Spielau patent discloses a laminate construction constituting a bonded multilayer composite of resin-impregnated outer plies with resin-impregnated core plies. (See the Spielau patent, col. 2, lines 32-36; col. 6, lines 40-49.) The laminates are generally produced by saturating the fiber layer with impregnating solution. (See *id.*, col. 5, lines 50-51.) Flat textile forms which can be readily impregnated and carry a large amount of resin are preferred. (See *id.*, col. 6, lines 4-7.) Thus, the Spielau patent does not disclose, teach, or suggest providing a core layer of poorly wetted or weakly bonded fibers, but rather discloses the core layer is *impregnated* with resin.

Likewise, the Westre reference discloses hybrid laminates including layers of titanium alloy foil alternating with layers of a polymeric matrix with reinforcing fibers embedded therein. (See the Westre reference, col. 2, lines 46-50; col. 5, lines 29-34.) The preferred organic polymeric composite is formed of a prepreg in the form of continuous parallel reinforcing fibers coated with a resin to form a continuous strip. (See *id.*, col. 3, lines 20-23.) Each ply in the hybrid laminate includes an organic polymeric resin within which is embedded parallel reinforcing fibers. (See *id.*, col. 6, lines 45-51.) In the case of thermoplastic composites, it is preferred that the laminates are prepared by successively laying down long continuous strips of thermoplastic resin preimpregnated fibrous tapes by means of a thermoplastic application head. (See *id.*, col. 8, lines 1-6.) Thus, like the Spielau patent, the Westre reference discloses that its laminate layers are *impregnated* or *embedded* within the resin matrix, and thus does not disclose, teach or suggest providing a core layer of poorly wetted or weakly bonded fibers.

The Fell patent does not cure these deficiencies, but rather discloses bonding of

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facing sheets to a thermoplastic honeycomb core or other thermoplastic core material by the use of a thermoplastic film. (See the Fell patent, col. 1, lines 16-21.)

Thus, the Spielau patent, the Westre reference, and the Fell patent, either alone or in combination, fail to disclose, teach or suggest all of the limitations of independent claims 1 and 8. Applicant, therefore, requests that the 35 U.S.C. § 103(a) rejection of claim 1 be withdrawn and that claim 1 be allowed. With respect to claims 2-4 and 9-11, which depend from claims 1 and 8, respectively, applicant requests that the 35 U.S.C. § 103(a) rejection of these claims be withdrawn, and that the claims be allowed for the same reasons as stated for claims 1 and 8.

The Krause Patent, the Westre Reference and the Fell Patent

Claims 1-4 and 7 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the Krause patent in view of the Westre reference, and further in view of the Fell patent.

Claim 1 has been amended to recite:

"... a multi-layered composite ... including:

- (i) a pair of resin-impregnated, fiber-containing layers...
- (ii) a fiber-containing core layer ... sandwiched between said pair of resin-impregnated, fiber-containing layers ...

wherein said fiber-containing core layer comprises poorly wetted or weakly bonded fibers."

Claim 1 is are patentable over the Krause patent, the Westre reference and the Fell patent because those references, either alone or in combination, fail to disclose, teach or suggest "... a multi-layered composite [] including ... a pair of resin-impregnated, fiber-containing layers ... [and] a fiber-containing core layer ... sandwiched between said pair of resin-impregnated, fiber-containing layers ... wherein said fiber-containing core layer comprises poorly wetted or weakly bonded fibers," as required by claim 1.

Rather, the Krause patent discloses a reinforced article comprising a first web of a thermosetting resin incorporating glass fibers therein and having a surface stratum

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comprising a compatible thermosetting resin having graphite fibers in the resin matrix thereof. (See the Krause patent, col. 2, lines 36-44.) The Krause patent states:

"It is important that the resin employed in the glass fiber molding compound and the graphite fiber molding compound be compatible in order to form an *integral* resin matrix during the hot compression molding of the composite moldable assembly achieving thereby the requisite high-strength of the cured article. It is, accordingly, preferred to employ substantially the same polyester resin in both molding compounds to achieve *interdiffusion* at the surfaces of the graphite fiber compound and glass fiber compound during the molding operation."

(See *id.*, col. 3, lines 25-35.) (emphasis added). Thus, the Krause patent discloses fibers that are dispersed/incorporated within the associated resin matrix, and thus fails to disclose teach or suggest providing a core layer of poorly wetted or weakly bonded fibers

As previously noted, the Westre reference discloses hybrid laminates including layers of titanium alloy foil alternating with layers of a polymeric matrix with reinforcing fibers embedded therein. (See the Westre reference, col. 2, lines 46-50; col. 5, lines 29-34.) The preferred organic polymeric composite is formed of a prepreg in the form of continuous parallel reinforcing fibers coated with a resin to form a continuous strip. (See *id.*, col. 3, lines 20-23.) Each ply in the hybrid laminate includes an organic polymeric resin within which is embedded parallel reinforcing fibers. (See *id.*, col. 6, lines 45-51.) In the case of thermoplastic composites, it is preferred that the laminates are prepared by successively laying down long continuous strips of thermoplastic resin preimpregnated fibrous tapes by means of a thermoplastic application head. (See *id.*, col. 8, lines 1-6.) Thus, the Westre reference discloses that its laminate layers are *impregnated* or *embedded* within the resin matrix, and thus does not disclose, teach or suggest providing a core layer of poorly wetted or weakly bonded fibers.

The Fell patent does not cure these deficiencies, but rather discloses bonding of facing sheets to a thermoplastic honeycomb core or other thermoplastic core material by the use of a thermoplastic film. (See the Fell patent, col. 1, lines 16-21.)

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Thus, the Krause patent, the Westre reference, and the Fell patent, either alone or in combination, fail to disclose, teach or suggest all of the limitations of claim 1. Applicant, therefore, requests that the 35 U.S.C. § 103(a) rejection of claim 1 be withdrawn and that claim 1 be allowed. With respect to claims 2-4 and 7, which depend from claim 1 and recite additional features of the invention, applicant requests that the 35 U.S.C. § 103(a) rejections of these claims be withdrawn, and that these claims be allowed, for the same reasons as stated for claim 1.

New Claims 27-29


New dependent claims 27-29 have been added to depend from independent claims 1, 8 and 26, respectively. These claims specifically recite a difference between the tensile modulus of the resin-impregnated fiber-containing layers and the fiber-containing core layer. New claims 27-29 are believed to be allowable for the same reasons as stated above in relation to independent claims 1, 8 and 26.

In view of the above, reconsideration of this application is respectfully requested and an early notice of allowance is earnestly solicited.

The Commissioner is hereby authorized to charge any required fees or credit any excess payment which may be associated with this communication to Duane Morris LLP Deposit Account 50-2061.

Respectfully submitted,

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